IN THE CLAIMS

The following listing of the claims is provided in accordance with 37 C.F.R. §1.121:

1. (currently amended) A method for performing an ultrasonic volumetric inspection of a backscattering material, comprising the steps of:

providing a two-dimensional ultrasonic phased array, the phased array includes a plurality of ultrasonic elements arranged in a two-dimensional rectilinear grid pattern extending in [[an]] azimuthal and elevational ~~direction~~ directions;

applying modulation to each of the ultrasonic elements in both the azimuthal and elevational directions to form an ultrasonic scanning beam configured to produce focal zones in an azimuth-depth plane and an elevational-depth plane; and

interrogating at least a portion of the backscattering material ~~by directing the ultrasonic scanning beam via a lens configured to provide a desirable F/D ratio to focus the ultrasonic elements of the ultrasonic phased array at desirable depths~~.

2. (currently amended) The method according to claim 1, wherein ~~each ultrasonic element is manipulatable to direct the ultrasonic scanning beam in at least one of the azimuthal and elevational directions to produce focal zones in at least one of an azimuth-depth plane and an elevational-depth plane~~ interrogating at least a portion of the backscattering material comprises directing the ultrasonic scanning beam via a lens configured to provide a desirable F/D ratio to focus the ultrasonic elements of the ultrasonic phased array at desirable depths.

3. (currently amended) The method according to claim 1, wherein the ultrasonic elements are ~~transducers~~ electronically modulated in at least one of time, frequency, phase, amplitude, bandwidth or combinations thereof.

4. (previously presented) The method according to claim 1, further comprising the step of:

manipulating the ultrasonic elements in at least one of the azimuthal and elevational directions to produce focal zones at various levels of the backscattering material.

5. (canceled).

6. (canceled).

7. (original) The method according to claim 1, wherein at least one of the ultrasonic elements is capable of emitting a divergent ultrasonic beam.

8. (original) The method according to claim 7, further comprising the step of forming discrete divergent ultrasonic scanning beams in the azimuthal and elevational directions.

9. (original) The method according to claim 8, further comprising the step of forming the discrete divergent ultrasonic scanning beams in an azimuth-depth plane.

10. (original) The method according to claim 8, further comprising the step of forming the discrete divergent ultrasonic scanning beams in an elevation-depth plane.

11. (original) The method according to claim 1, wherein each ultrasonic element includes an aperture and wherein the method further comprises the step of independently adjusting the aperture of selected ultrasonic elements in two-dimensions.

12. (currently amended) The method according to claim [5]1, further comprising the step of focusing selected ultrasonic elements in two-dimensions.

13. (previously presented) The method according to claim 1, wherein the step of interrogating at least a portion of the backscattering material includes taking a sequence of shots to produce a uniform beam sound field.

14. (previously presented) The method according to claim 1, further comprising the step of manipulating the ultrasonic scanning beam in azimuth, elevation and depth directions to produce at least one of a uniform and specific scanning beam for every point inside a volume of the backscattering material.

15. (original) The method according to claim 14, wherein the step of manipulating is accomplished electronically.

16. (original) The method according to claim 1, wherein the two-dimensional phased array includes aperture control.

17. (previously presented) The method according to claim 16, wherein the aperture control provides control of an aperture of the two-dimensional phased array in at least one of the azimuth and elevational directions to provide at least one of a uniform and specific scanning beam at every point inside a volume of the backscattering material.

18. (currently amended) A two-dimensional ultrasonic phased array for inspecting a backscattering material, the two-dimensional phased array, comprising:

a plurality of ultrasonic elements arranged in a two-dimensional rectilinear grid pattern extending in [an] azimuthal and elevational ~~direction~~ directions, each ultrasonic element is individually addressable and controllable to manipulate the formation of an

ultrasonic scanning beam in both the azimuthal and elevational directions and to produce focal characteristics throughout the volume of the backscattering material.

19. (currently amended) The two-dimensional ultrasonic phased array of claim 18, wherein the ultrasonic elements are ~~transducers.~~ electronically modulated in at least one of time, frequency, phase, amplitude, bandwidth or combinations thereof.

20. (original) The two-dimensional ultrasonic phased array of claim 18, wherein the ultrasonic elements produce focal zones at various levels in an azimuth-depth plane.

21. (original) The two-dimensional ultrasonic phased array of claim 20, wherein the ultrasonic elements produce focal zones at various levels in an elevation-depth plane.

22. (original) The two-dimensional ultrasonic phased array of claim 18, wherein a selected number of ultrasonic elements define an aperture.

23. (original) The two-dimensional ultrasonic phased array of claim 22, wherein the ultrasonic elements selected define a shape for the aperture.

24. (canceled).

25. (original) The two-dimensional ultrasonic phased array of claim 18, wherein the ultrasonic elements have a dimension in the azimuthal direction of about 0.5 to about 7 acoustic wavelengths.

26. (original) The two-dimensional ultrasonic phased array of claim 25, wherein the ultrasonic elements have a dimension in the elevation direction of about 0.5 to about 20 acoustic wavelengths.

27. (original) The two-dimensional ultrasonic phased array of claim 18, wherein each ultrasonic element is configured to emit a divergent ultrasonic scanning beam.

28. (original) The two-dimensional ultrasonic phased array of claim 27, wherein discrete divergent ultrasonic scanning beams are formed in the azimuthal and the elevational directions.

29. (original) The two-dimensional ultrasonic phased array of claim 28, wherein discrete divergent ultrasonic scanning beams are formed in an azimuth-depth plane.

30. (original) The two-dimensional ultrasonic phased array of claim 29, wherein the discrete divergent ultrasonic scanning beams formed in the azimuth-depth plane define focal zones in the azimuth-depth plane.

31. (original) The two-dimensional ultrasonic phased array of claim 30, wherein discrete divergent ultrasonic scanning beams are formed in an elevation-depth plane.

32. (original) The two-dimensional ultrasonic phased array of claim 31, wherein the discrete divergent ultrasonic scanning beams formed in the elevation-depth plane define focal zones in the elevation-depth plane.

33. (original) The two-dimensional ultrasonic phased array of claim 18, wherein the ultrasonic elements are placed symmetrically about a central axis of the array extending in the azimuthal direction.

34. (currently amended) The two-dimensional ultrasonic phased array of claim 18, further comprising a focusing lens oriented in the elevational direction and operatively associated with at least one ultrasonic element, wherein the focusing lens is configured to provide a desirable F/D ratio to focus the ultrasonic elements of the ultrasonic phased array at desirable depths.

35. (canceled).

36. (original) The two-dimensional ultrasonic phased array of claim 34, wherein the focusing lens is configured and dimensioned to produce one of a constant, an increasing and a decreasing F/D ratio over the operating range of the array.

37. (currently amended) A two-dimensional ultrasonic phased array for inspecting a backscattering material, the two-dimensional phased array, comprising:

a rectilinear array of ultrasonic elements extending in an azimuth direction and an elevation direction, wherein each ultrasonic element is configured to emit a divergent ultrasonic scanning beam which divergent ultrasonic scanning beams combine to form a single ultrasonic scanning beam, wherein the divergent ultrasonic scanning beams formed in an azimuth-depth plane define multiple focal zones in the azimuth-depth plane and wherein divergent ultrasonic scanning beams formed in an elevation-depth plane define multiple focal zones in the elevation-depth plane.

38. (currently amended) The two-dimensional ultrasonic phased array of claim 37, wherein the ultrasonic elements are ~~transducers~~ electronically modulated in at least one of time, frequency, phase, amplitude, bandwidth or combinations thereof.

39. (original) The two-dimensional ultrasonic phased array of claim 37, wherein the ultrasonic elements have a dimension in the azimuthal direction of about 0.5 to about 7 acoustic wavelengths.

40. (original) The two-dimensional ultrasonic phased array of claim 39, wherein the ultrasonic elements have a dimension in the elevation direction of about 0.5 to about 20 acoustic wavelengths.

41. (original) The two-dimensional ultrasonic phased array of claim 37, further comprising a focusing lens oriented in the elevational direction and operatively associated with at least one ultrasonic element.

42. (original) The two-dimensional ultrasonic phased array of claim 41, wherein the focusing lens is configured and dimensioned to produce one of a constant, an increasing and a decreasing F/D ratio over the operating range of the array.